

Case Report

# GOLTZ GORLIN SYNDROME- A CASE REPORT WITH OVERVIEW

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## Abstract:

Goltz Gorlin syndrome (GGS) is an multisystemic disease with an autosomal dominant disorder, with complete variance, though irregular cases have been described. This article includes a case report and an extensive review of the GGS with regard to its history, incidence, etiology, features, investigations, diagnostic criteria, keratocystic odontogenic tumor and treatment modalities. case of a 32-year-old female patient presenting with three major features of Gorlin-Goltz syndrome. Radiologic findings of the syndrome are easily identifiable on Orthopantomogram, cbct scans. These investigations prompt an early verification of the disease, which is very important to prevent recurrence and better survival rates from the coexistent diseases.

**Key-words:** *Goltz Gorlin Syndrome, Basal Cell Carcinoma, Odontogenic Keratocysts, Cryosurgery*

## 1. Introduction

Gorlin-Goltz syndrome is a dominant inheritance disorder with a high degree of particular and variable genetic trait. Jarisch and White made the first descriptions of patients with this syndrome, highlighting in 1894 characterized by basal cell carcinomas, odontogenic keratocysts, palmar and/or plantar pits, and ectopic calcifications of the falx cerebri(1). Pathophysiology of the syndrome is attributed to abnormalities in the long arm of chromosome 9 (q22.3-q31) and loss of, or mutations of human patched gene (PTCH1 gene). Diagnosis is based upon established major and minor clinical and radiological criteria and ideally confirmed by deoxyribo nucleic acid (DNA) analysis (1). Mutations in this gene results in loss of control of several genes known to play a role in organogenesis, carcinogenesis and odontogenesis thus resulting in the development of GGS(2). The prevalence is about 1/60000 live births, and it has both sporadic and familial incidence. This syndrome affects both male and female equally and are seen during the first, second, third decades of life.

This syndrome has been termed with several names such as, basal cell nevus syndrome, GGS, nevoid basal cell carcinoma syndrome (NBCCS), multiple basal cell carcinoma (BCC) syndrome, multiple basalioma syndrome, jaw cyst basal cell tumor skeletal anomalies syndrome, jaw cyst bifid rib basal cell nevus syndrome, nevoid basalioma, odontogenic keratocysts skeletal anomalies syndrome and fifth phacomatosis(2).

## 2. Case Report

A 32 year old female patient came to department with a complaint of decay of tooth in the right lower back teeth region noticed since 3 months. Pain was continuous, gradually increasing in nature. Patient had undergone treatment for odontogenic keratocyst once before 10 years back. On general examination patient was moderately build and nourished with presence of nevoid basal cell carcinoma, palmar and plantar pits present with both the palms, multiple odontogenic keratocyst. On intraoral examination mouth opening adequate occlusion intact, a diffuse swelling noted over the 48 edentulous region measuring approximately 2x1cm. The skin overlying mucosa was normal no pus discharge and sinus opening noted and generalized gingival recession present. Missing teeth wrt 13,17,27,28,38,48. Crown placement wrt 47. On palpation the swelling was bony hard with egg shell crackling present with tenderness was present on palpation. Swelling was non-compressible and non-reducible. Provisionally diagnosed as odontogenic keratocyst. On radiographic examination a well-defined homogenous radiolucency of size 22.8x19.4mm is seen with scalloping border in 48 region extending to angle and ramus on the right side of mandibular region suggestive of okc and a small radiolucent round lesion seen in 38 region (microcyst) was present on OPG. CBCT was taken which revealed a radiolucent lesion with volume of 1.208cm<sup>3</sup>, width 10.40, height 13.20, depth 16.80 over the right ramus region. On aspiration creamy white viscous suspension was noted. Patient was planned for cyst enucleation and chemical cauterization under local anesthesia. Under all aseptic condition Right inferior alveolar nerve block given Ward's incision given using no.15 blade bone window prepared using round bur Cyst enucleation done, Carnoy's solution applied over cystic cavity Cystic cavity irrigated with saline and betadine Primary closure attained using 3-0 silk. Patient was later followed up for six months and one year. Patient is still being followed up for the same.



PALMAR AND PLANTAR PITS



PRE-OP OPG



PRE-OP CBCT



INTRA-OP



SPECIMEN

### 3. Discussion

The presence of two major signs (nevroid basal cell carcinoma, multiple odontogenic keratocysts, presence of palmar plantar) helped us make a diagnosis of GGS in the patient. A literature review of GGS is as follows:

#### 3.1 History

The first report of the syndrome was made in 1894 by Jarisch and White in a patient with multiple BCCs, scoliosis and learning disability(3). In 1939, Straith described a case with multiple basocellular carcinomas and cysts. Binkley and Johnson in 1951 and Howell and Caro in 1959 observed a relationship between basal cell epitheliomas and developmental malformations(4). Gross in 1953 presented a case with additional signs such as synostosis of the first left rib and bilateral bifurcation of the 6th ribs(4).

In 1960, Robert James Gorlin and William Goltz discovered the classical triad (multiple basocellular epitheliomas, keratocysts in the jaws and bifid ribs) that established the diagnosis of this syndrome(5). Later this triad was modified by Rayner et al., who established

that cysts had to appear simultaneously, either with calcifications of the falx cerebri, or with palmar and plantar pits, in order to arrive at a diagnosis(6). The association of palmar and plantar pits with the syndrome was first described by Bettley and Ward.

### 3.2 Keratocystic Odontogenic Tumor and Its Treatment

Odontogenic keratocysts linked with GGS are now termed as "keratocystic odontogenic tumor" (KCOT). These are a constant feature present in about 75% of cases with GGS(7). KCOT are often the first sign of GGS in 78% of cases. They develop during the first decade of life, usually after 7 years and peak during the second and third decade(8). Their occurrence is approximately a decade earlier than that of odontogenic keratocysts not associated with the syndrome. The male to female ratio is 1:0.62 for conventional odontogenic keratocysts and 1:1 for KCOT(9).

In syndromic cases, more commonly maxillary molar area is affected. Recurrence rate is higher in syndromic cases (63%). Woolgar et al. have also noted significant differences histologically. OKC associated with Basal Cell Nevus Syndrome showed more number of satellite cyst, solid islands of epithelial proliferation and odontogenic rests within the capsule, and increased mitotic figures in the epithelium lining the main cavity(10).

OKC's falling in the category of Keratocystic Odontogenic Tumor (KCOT) may be associated with Gorlin-Goltz Syndrome in the form of multiple cystic lesions. Katase et al. analyzed the neoplastic nature and biological potential of sporadic and nevoid basal cell carcinoma syndrome (NBCCS)-associated KCOT. Heparanase is an endo-d-glucuronidase enzyme that specifically cleaves heparan sulfate and the increase of its level in tumors promotes invasion, angiogenesis, and metastasis(11). In his study, all odontogenic cysts have shown positive immunoreactions for the heparanase for the heparin protein in various intensities(12). Intense gene and protein expressions have been observed in KCOT associated with NBCCS, as compared with sporadic ones and dentigerous cyst. So, heparanase expression may be correlated with the neoplastic properties of KCOT, particularly in NBCCS-associated cases(13).

There are two methods of treating odontogenic keratocysts: Conservative or aggressive. In the conservative method, simple enucleation with or without curettage and marsupialization are suggested. Aggressive methods include peripheral ostectomy, chemical curettage with Carnoy's solution and resection(14). Application of Carnoy's solution into the cyst cavity for 3 min after enucleation results in a lower rate of recurrence (0–2.5%) without any damage to the inferior alveolar nerve. Moreover, the use of Carnoy's solution following cyst enucleation (applied over areas where the cyst was attached to the mucosa) and cryosurgery (because liquid nitrogen devitalizes bone, while leaving the inorganic framework untouched) is advised to destroy epithelial remnants and dental lamina within the osseous margin and thus, prevent recurrences. Cryosurgery using liquid nitrogen is indicated in the large complex mandibular lesions if there is a risk of damage to vital structures with conventional treatment methods(15).

Consideration is given to en bloc resection of odontogenic keratocysts in the following situations: (1) When cysts recur despite previous enucleation with an adjunctive procedure. (2) When cysts recur despite previous marsupialization and enucleation with an adjunctive procedure. (3) In cases of multilocular (multilobular) aggressive intraosseous cysts. (4) In cases of multiple nonsyndromic and syndromic cysts. (5) Cysts exhibiting aggressive clinical behavior that should require resection as the initial surgical treatment. In children,

conservative management is considered, because an aggressive operation can affect tooth eruption and development of the involved jaw(15).

Although benign, the recurrence rate after excision of KCOT is high, ranging from 12% to 62.5% and multiple recurrences do occur. Recurrence rates of 82% and 61% for KCOT and solitary odontogenic keratocysts, respectively, has also been reported(16). Due to the recurrence of odontogenic keratocysts, jaw deformities may result from multiple surgeries. An annual dental panoramic radiograph is usually suggested between the ages of 8 and 40 years to aid in monitoring the recurrence or development of new KCOT(16). A recurring cyst can be a new cyst that originates from epithelial residue or a microcyst left behind in the overlying mucosa. It is believed that the aggressive behavior and high rate of recurrence of KCOT are due to a higher rate of proliferation of the epithelial lining(16).

Apart from surgical enucleation for cystic lesions, adjunctive therapies like chemical cauterization is useful to prevent recurrence by fixing the daughter cyst or remnants of epithelial lining that are not removed during the enucleation procedure. Carnoy's solution is a phenolic compound with tissue fixative properties. Voorsmit et al. have demonstrated that Carnoy's solution penetrates the bone to the depth 1.54 mm following a 5 minutes application without any damage to the inferior alveolar nerve(16).

#### **4. Conclusion**

Gorlin-Goltz syndrome is a well-known Autosomal Dominant disorder. The incidence reported worldwide ranges from 1 in 50,000 to 1 in 150,000(17-18). Not many cases have been reported in India, and hence we report here a rare case and importance of multidisciplinary approach in management of the syndrome. Thorough extraoral and intraoral examinations along with OPG, skull and chest radiographs help in proper diagnosis of the condition. This investigation prompts an early verification of the disease, which is very important to prevent recurrence and better survival rates from the existent diseases. OKC of the jaws which can cause disfigurement of the face, mobility and even loss of teeth can be avoided by early detection and treatment of the same.

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